



# CEP840A/CEB840A CEF840A

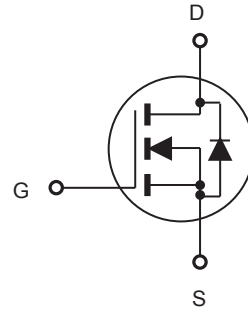
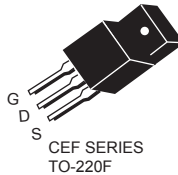
## N-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

### FEATURES

| Type    | V <sub>DSS</sub> | R <sub>DS(ON)</sub> | I <sub>D</sub>    | @V <sub>GS</sub> |
|---------|------------------|---------------------|-------------------|------------------|
| CEP840A | 500V             | 0.85Ω               | 8.5A              | 10V              |
| CEB840A | 500V             | 0.85Ω               | 8.5A              | 10V              |
| CEF840A | 500V             | 0.85Ω               | 8.5A <sup>d</sup> | 10V              |

- Super high dense cell design for extremely low R<sub>DS(ON)</sub>.
- High power and current handling capability.
- Lead-free plating ; RoHS compliant.



### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ\text{C}$ unless otherwise noted

| Parameter  | Symbol                            | Limit      |                  | Units |
|--|-----------------------------------|------------|------------------|-------|
|  |                                   | TO-220/263 | TO-220F          |       |
| Drain-Source Voltage   | V <sub>DS</sub>                   | 500        |                  | V     |
| Gate-Source Voltage  | V <sub>GS</sub>                   | ±30        |                  | V     |
| Drain Current-Continuous @ T <sub>C</sub> = 25°C<br>@ T <sub>C</sub> = 100°C | I <sub>D</sub>                    | 8.5        | 8.5 <sup>d</sup> | A     |
|  |                                   | 6          | 6 <sup>d</sup>   | A     |
| Drain Current-Pulsed <sup>a</sup>  | I <sub>DM</sub> <sup>e</sup>      | 34         | 34 <sup>d</sup>  | A     |
| Maximum Power Dissipation @ T <sub>C</sub> = 25°C<br>- Derate above 25°C     | P <sub>D</sub>                    | 150        | 48               | W     |
|  |                                   | 1          | 0.3              | W/°C  |
| Single Pulsed Avalanche Energy <sup>h</sup>                                  | E <sub>AS</sub>                   | 196        |                  | mJ    |
| Single Pulsed Avalanche Current <sup>h</sup>                                 | I <sub>AS</sub>                   | 7.5        |                  | A     |
| Operating and Store Temperature Range  | T <sub>J</sub> , T <sub>stg</sub> | -55 to 175 |                  | °C    |

### Thermal Characteristics

| Parameter                               | Symbol           | Limit |     | Units |
|---|------------------|-------|-----|-------|
| Thermal Resistance, Junction-to-Case    | R <sub>θJC</sub> | 1     | 3.1 | °C/W  |
| Thermal Resistance, Junction-to-Ambient | R <sub>θJA</sub> | 62.5  | 65  | °C/W  |

This is preliminary information on a new product in development now .  
Details are subject to change without notice .

Rev 1. 2011.Nov  
<http://www.cetsemi.com>



# CEP840A/CEB840A CEF840A

## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

| Parameter  | Symbol       | Test Condition  | Min | Typ  | Max  | Units    |
|--|--------------|---|-----|------|------|----------|
| <b>Off Characteristics</b>   |              |   |     |      |      |          |
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                                     | 500 |      |      | V        |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS} = 500V, V_{GS} = 0V$                                      |     |      | 1    | $\mu A$  |
| Gate Body Leakage Current, Forward   | $I_{GSSF}$   | $V_{GS} = 30V, V_{DS} = 0V$                                       |     |      | 100  | nA       |
| Gate Body Leakage Current, Reverse   | $I_{GSSR}$   | $V_{GS} = -30V, V_{DS} = 0V$                                      |     |      | -100 | nA       |
| <b>On Characteristics<sup>b</sup></b>  |              |   |     |      |      |          |
| Gate Threshold Voltage   | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                                 | 2   |      | 4    | V        |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 4.3A$  |     | 0.68 | 0.85 | $\Omega$ |
| <b>Dynamic Characteristics<sup>c</sup></b>   |              |   |     |      |      |          |
| Input Capacitance  | $C_{iss}$    | $V_{DS} = 25V, V_{GS} = 0V,$<br>$f = 1.0\text{ MHz}$              |     | 1580 |      | pF       |
| Output Capacitance   | $C_{oss}$    |   |     | 125  |      | pF       |
| Reverse Transfer Capacitance   | $C_{rss}$    |   |     | 15   |      | pF       |
| <b>Switching Characteristics<sup>c</sup></b>   |              |   |     |      |      |          |
| Turn-On Delay Time   | $t_{d(on)}$  | $V_{DD} = 250V, I_D = 7A,$<br>$V_{GS} = 10V, R_{GEN} = 9.1\Omega$ |     | 20   | 40   | ns       |
| Turn-On Rise Time  | $t_r$        |   |     | 5    | 10   | ns       |
| Turn-Off Delay Time  | $t_{d(off)}$ |   |     | 38   | 76   | ns       |
| Turn-Off Fall Time   | $t_f$        |   |     | 4    | 8    | ns       |
| Total Gate Charge  | $Q_g$        | $V_{DS} = 400V, I_D = 7A,$<br>$V_{GS} = 10V$                      |     | 25   | 33.3 | nC       |
| Gate-Source Charge   | $Q_{gs}$     |   |     | 5    |      | nC       |
| Gate-Drain Charge  | $Q_{gd}$     |   |     | 6    |      | nC       |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b>  |              |   |     |      |      |          |
| Drain-Source Diode Forward Current   | $I_S^f$      |   |     |      | 7    | A        |
| Drain-Source Diode Forward Voltage <sup>b</sup>  | $V_{SD}^g$   | $V_{GS} = 0V, I_S = 7A$   |     |      | 1.5  | V        |
| <b>Notes :</b> □<br>a.Repetitive Rating : Pulse width limited by maximum junction temperature .<br>b.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ □<br>c.Guaranteed by design, not subject to production testing.□<br>d.Limited only by maximum temperature allowed .<br>e.Pulse width limited by safe operating area .<br>f.Full package $I_{S(max)}$ =4.8A .<br>g.Full package $V_{SD}$ test condition $I_S = 4.8A$ .<br>h.L = 7mH, $I_{AS} = 7.5A, V_{DD} = 50V, R_G = 25\Omega$ , Starting $T_J = 25\text{ C}$ |              |   |     |      |      |          |



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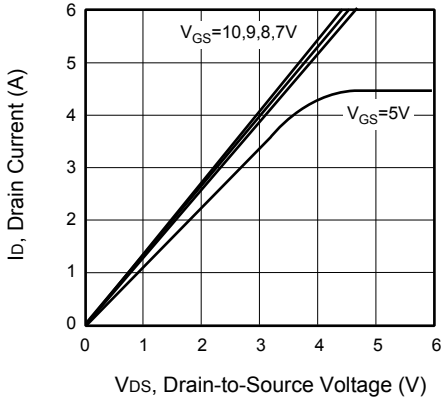


Figure 1. Output Characteristics

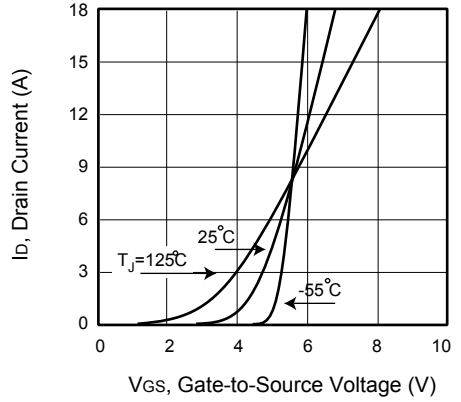


Figure 2. Transfer Characteristics

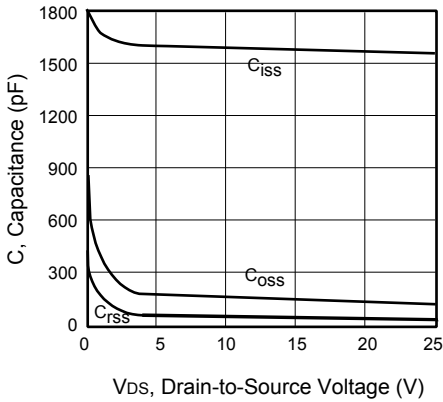


Figure 3. Capacitance

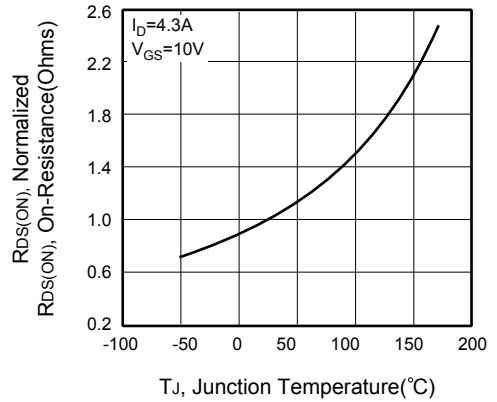


Figure 4. On-Resistance Variation with Temperature

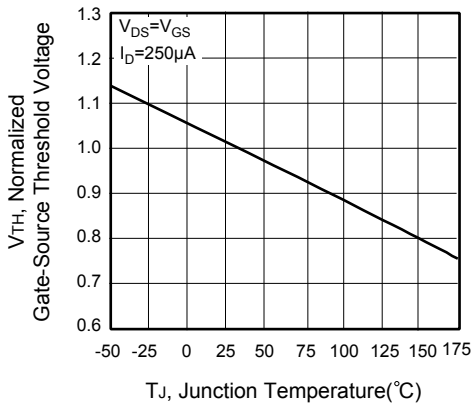


Figure 5. Gate Threshold Variation with Temperature

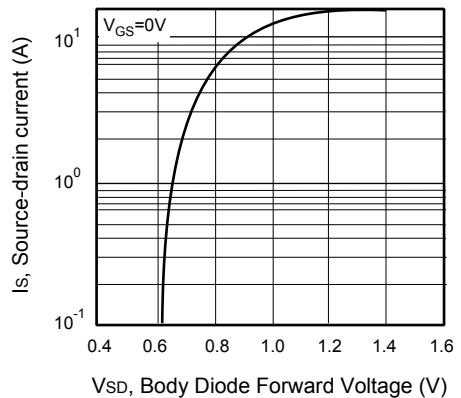


Figure 6. Body Diode Forward Voltage Variation with Source Current



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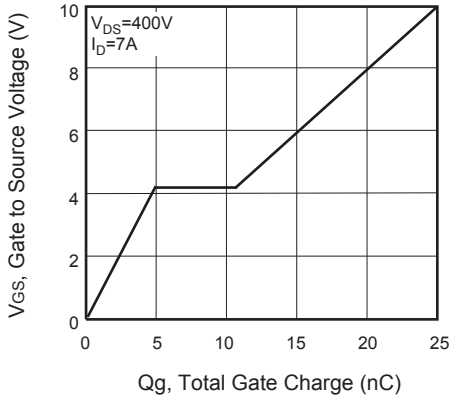


Figure 7. Gate Charge

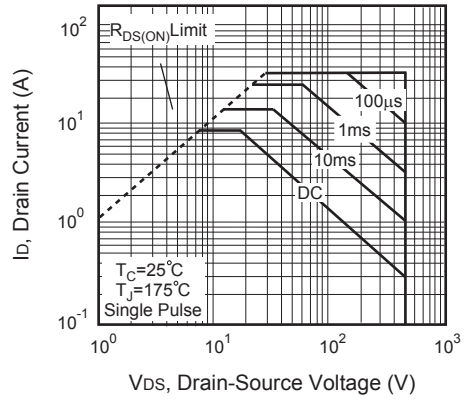


Figure 8. Maximum Safe Operating Area



Figure 9. Switching Test Circuit



Figure 10. Switching Waveforms

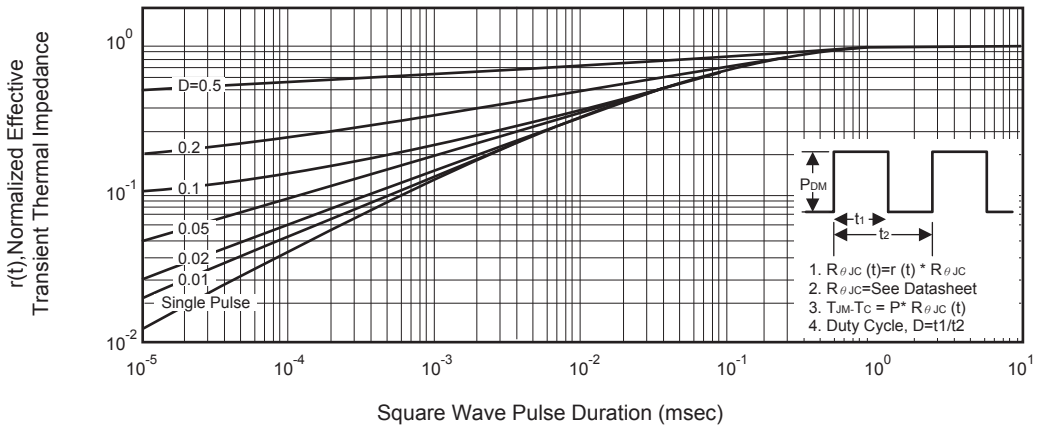


Figure 11. Normalized Thermal Transient Impedance Curve